


525 Rec'd PCT/PTO 22 DEC 2000

FORM PTO-1380U S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV 10-2000)		ATTORNEY'S DOCKET NO. 00771.00016
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (if known, See 37 C.F.R. 1.5) TBA 09/720431
INTERNATIONAL APPLICATION NO. PCT/NL99/00368	INTERNATIONAL FILING DATE 14 June 1999	PRIORITY DATE CLAIMED 23 June 1998
TITLE OF INVENTION IMPROVED CATALYSER HOUSING		
APPLICANT(S) FOR DO/EO/US Hermanus G. GROBBENHAAR		
Applicant herewith submits to the United State Designated/Elected Office (DO/EO/US) the following items and other information:		
<ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</li> <li>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</li> <li>3. <input checked="" type="checkbox"/> This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)).</li> <li>4. <input type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).</li> <li>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))             <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).</li> <li>b. <input checked="" type="checkbox"/> has been communicated by the International Bureau.</li> <li>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</li> </ol> </li> <li>6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2)).</li> <li>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))             <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</li> <li>b. <input type="checkbox"/> have been communicated by the International Bureau.</li> <li>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li>d. <input checked="" type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</li> <li>10. <input checked="" type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol>		
Items 11-16 below concern other document(s) or information included:		
<ol style="list-style-type: none"> <li>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98.</li> <li>12. <input type="checkbox"/> An Assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.</li> <li>13. <input checked="" type="checkbox"/> A FIRST preliminary amendment.             <ul style="list-style-type: none"> <li><input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</li> </ul> </li> <li>14. <input type="checkbox"/> A substitute specification.</li> <li>15. <input type="checkbox"/> A change of power of attorney and/or address letter.</li> <li>16. <input checked="" type="checkbox"/> Other items or information: International Search Report (ISA/EPO)</li> </ol>		

U.S. APPLICATION NO. (If known, See 37 CFR 1.5) TBA <b>097720431</b>		INTERNATIONAL APPLICATION NO PCT/NL99/00368		ATTORNEY'S DOCKET NO 00771.00016	
17. ■ The following fees are submitted:  <b>Basic National Fee (37 CFR 1.492(a)(1)-(5):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO . . . . . \$1,000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO . . . . . \$ 860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.455(a)(2)) paid to USPTO . . . . . \$ 710.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) . . . . . \$ 690.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) . . . . . \$ 100.00				CALCULATIONS	PTO USE ONLY
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$ 860.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ 0.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	20 -20 =	0	X \$18.00	\$ 0.00	
Independent Claims	1 - 3 =	0	X \$ 80.00	\$ 0.00	
Multiple dependent claims (if applicable)			X \$270.00	\$ 0.00	
TOTAL OF ABOVE CALCULATIONS =				\$ 860.00	
<input type="checkbox"/> Applicant claims small entity status See 37 CFR 1.27. The fees indicated below above are reduced by 1/2.				\$	
SUBTOTAL =				\$ 860.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$ 0.00	
TOTAL NATIONAL FEE =				\$ 860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40 00 per property.				\$	
TOTAL FEES ENCLOSED =				\$	
+				Amount to be: refunded	\$
				charged	\$
a. <input type="checkbox"/> A check in the amount of \$_____ to cover the above fees is enclosed. b. ■ Please charge my Deposit Account No. 19-0733 in the amount of <u>\$860.00</u> to cover the above fees. A duplicate copy of this sheet is enclosed. c. ■ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-0733. A duplicate copy of this sheet is enclosed. NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO:  Banner & Witcoff, Ltd. Eleventh Floor 1001 G Street, N.W. Washington, D.C. 20001-4597  Telephone: (202) 508-9100					
 SIGNATURE  Franklin D. Wolfe Registration No. 19,724  Date: December 22, 2000					

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of:	) Atty. Docket No.: 00771.00016
<b>Hermanus G. GROBBENHAAR</b>	)
Serial No.: TBA	) U.S. National Stage of
Filed: Herewith (December 22, 2000)	) International Application No.:
For: IMPROVED CATALYSER	) PCT/NL99/00368
HOUSING	)

**PRELIMINARY AMENDMENT**

BOX PCT  
Assistant Commissioner of Patents  
Washington, D. C. 20231

Sir:

Prior to examination and calculation of any claim fees, please amend the instant application as follows:

**IN THE ABSTRACT:**

Insert the following Abstract, which is also provided herewith on a separate sheet:

**--ABSTRACT OF THE DISCLOSURE**

The invention relates to a catalytic converter unit received between a first and a second exhaust section of an exhaust of an internal combustion engine, comprising: a catalytic converter housing; a catalytic converter element arranged in the catalytic converter housing; a first connecting piece arranged between the first exhaust section and the catalytic converter housing; and a second connecting piece arranged between the second exhaust section and the catalytic converter housing, wherein at least the first exhaust section comprises at least two channels which are separated by a first separating element, and wherein the catalytic converter element is divided in longitudinal direction into a number of parts corresponding with the number of channels, which parts are separated by at least a second separating element aligned relative to the first separating element. These measures enable separated supply to the catalytic converter, also in the case of exhaust systems with separate channels for the supply of exhaust gases from

different cylinders or different groups of cylinders. The use of such a separating element prevents destruction of the catalytic converter element in the case of possible temperature stresses. The partitions used with such separated channels could after all crush such a ceramic catalytic converter element.--

### **IN THE SPECIFICATION:**

Page 1, between the title of the application and the first paragraph, insert the heading --Field of the Invention--.

Page 1, between lines 14 and 15, insert the heading --Background of the Invention--.

Page 1, between lines 34 and 35, insert the heading --Brief Description of the Invention--.

Page 4, between lines 4 and 5, insert the heading --Brief Description of the Drawings--.

Page 4, between lines 24 and 25, insert the heading --Detailed Description of the Invention--.

### **IN THE CLAIMS:**

The claim amendments presented herein are based upon claims 1-11 as amended on June 26, 2000 during prosecution of the PCT application, which amended claims are annexed (**Amended Sheets**) to the International Preliminary Examination Report.

Please amend claims 4-6, 8 and 10 as follows:

Claim 4, line 2, delete "2 or 3,".

Claim 5, line 2, delete "2 or 3,".

Claim 6, lines 1-2, delete "any of the foregoing claims" and insert therefor --claim 1--.

Claim 8, lines 1-2, delete "any of the foregoing claims" and insert therefor --claim 1--.

Claim 10, line 2, delete "or 9".

Insert the following new claims 12-20:

--12. Catalytic converter unit as claimed in claim 2, characterized in that a narrow gap is situated between the first separating element (11) and the second separating element (7).

13. Catalytic converter unit as claimed in claim 3, characterized in that a narrow gap is situated between the first separating element (11) and the second separating element (7).

14. Catalytic converter unit as claimed in claim 2, characterized in that the catalytic converter element is divided in transverse direction into at least two sections (5A, 6A; 5B, 6B) separated by an interspace (19) and that the first separating element (11) connects onto the second separating element (7).

15. Catalytic converter unit as claimed in claim 3, characterized in that the catalytic converter element is divided in transverse direction into at least two sections (5A, 6A; 5B, 6B) separated by an interspace (19) and that the first separating element (11) connects onto the second separating element (7).

16. Catalytic converter unit as claimed in claim 2, characterized in that the catalytic converter element (5, 6) and the catalytic converter housing (8) are separated by a spacer element (20) extending around the catalytic converter element (5, 6).

17. Catalytic converter unit as claimed in claim 3, characterized in that the catalytic converter element (5, 6) and the catalytic converter housing (8) are separated by a spacer element (20) extending around the catalytic converter element (5, 6).

18. Catalytic converter unit as claimed in claim 2, characterized in that rotation between the axis of the catalytic converter housing (8) and the axis of at least the first exhaust section (2) is possible on an axis extending transversely of one of these axes due to the connection (16) between the first conical connecting piece (9) and the catalytic converter housing (8), wherein the conical connecting piece (9) on the outside of the catalytic converter housing is connected sealingly to the outside of the catalytic converter housing (8) and wherein a gap is formed between the edge of the catalytic converter housing (8) and the conical connecting piece (9).

19. Catalytic converter unit as claimed in claim 3, characterized in that rotation between the axis of the catalytic converter housing (8) and the axis of at least the first exhaust section (2) is possible on an axis extending transversely of one of these axes due to the connection (16) between the first conical connecting piece (9) and the catalytic converter

housing (8), wherein the conical connecting piece (9) on the outside of the catalytic converter housing is connected sealingly to the outside of the catalytic converter housing (8) and wherein a gap is formed between the edge of the catalytic converter housing (8) and the conical connecting piece (9).

20. Catalytic converter unit as claimed in claim 9, characterized in that the first (11) or the second (7) separating element is provided on its edges at the side of the other separating element (7, 11) with a thickened portion (18) which mutually separates the channels in a position of the catalytic converter housing (8) relative to the exhaust section (2) which varies from the normal position.--

#### REMARKS

By this amendment, an Abstract has been inserted and multiple dependencies have been eliminated from the claims. Examination on the merits of the instant application is respectfully requested.

Respectfully submitted,



Franklin D. Wolffe  
Reg. No. 19,724

Date: December 22, 2000

Banner & Witcoff, Ltd.  
1001 G Street, N.W.  
Washington, D. C. 20001-4597  
(202) 508-9100

Attachment: Abstract of the Disclosure

FDW:lab

IMPROVED CATALYSER HOUSING

5           The present invention relates to a catalytic converter unit received between a first and a second exhaust section of an exhaust of an internal combustion engine, comprising a catalytic converter housing, a catalytic converter element arranged in the catalytic  
10 converter housing; a first connecting piece arranged between the first exhaust section and the catalytic converter housing; and a second connecting piece arranged between the second exhaust section and the catalytic converter housing.

15           Such catalytic converter units are generally known. At present use is usually made of a metal as substrate for catalytic converter units, on which metal the catalytic materials are arranged. The substrate is provided with channels extending in longitudinal  
20 direction, on the inside of which said materials are arranged.

          When attempting to increase the effectiveness of such catalytic converter units it is important that the temperatures of the combustion gases are as high as  
25 possible; it is therefore important that the catalytic converter units are placed as close as possible to the engine. It is also important that the substrate can withstand high temperatures. Use is made for this purpose of a ceramic element. However, the ceramic material has  
30 the property that it is difficult to manufacture in dimensionally stable manner and that the material is brittle, breaks easily and has a different thermal coefficient of expansion than the metals commonly used in this art.

35           The object of the present invention is therefore to provide such a catalytic converter unit, the construction of which is suitable for the use of catalytic converter substrates of ceramic material.

This objective is achieved in that at least the first exhaust section comprises at least two channels which are separated by a first separating element, that the catalytic converter element is divided in the longitudinal direction into a number of parts corresponding with the number of channels, which parts are separated by at least a second separating element aligned relative to the first separating element.

These measures enable separated supply to the catalytic converter, also in the case of exhaust systems with separate channels for the supply of exhaust gases from different cylinders or different groups of cylinders. The use of such a separating element prevents destruction of the catalytic converter element in the case of possible temperature stresses. The partitions used with such separated channels could after all crush such a ceramic catalytic converter element.

Although, as stated above, the invention is mainly applicable in ceramic substrates of catalytic converters, it is not limited thereto; it is likewise applicable in other types of catalytic converter, for instance metal, or in the future perhaps plastic substrates.

As stated in claims 2 and 3, this measure is possible in diverse configurations. The use of a gap between the first separating element and the second separating element results in improved protection of the catalytic converter in the case of possible temperature expansion.

This advantage is enhanced further when the catalytic converter element is divided in transverse direction into at least two sections which are separated by an interspace and the first separating element connects onto the second separating element.

The feature that the catalytic converter element and the catalytic converter housing are separated by a spacer element extending around the catalytic



converter unit also provides protection for the catalytic converter unit if it should extend in radial direction.

As stated, it is important that the catalytic converter unit be placed as close as possible to the engine in respect of the then higher temperature of the exhaust gases. When the engine is started the catalytic converter then becomes effective sooner. In respect of engine vibration it is important that rotation between the axis of the catalytic converter housing and the axis of at least the first exhaust section is possible on an axis extending transversely of one of these axes due to the connection between the first conical connecting piece and the catalytic converter housing, wherein the conical connecting piece connected sealingly to the outside of the catalytic converter housing and wherein a gap is formed between the edge of the catalytic converter housing and the conical connecting piece.

According to a particular embodiment hereof a shoulder is formed on the outside of the catalytic converter housing, wherein a sealing ring is arranged against the outside of the shoulder, and the first conical connecting piece rests against the sealing ring. This is structurally a particularly attractive embodiment. Said gap not only enables a rotation but also enables mutual axial displacement of the of the elements without destroying the catalytic converter housing.

According to another preferred embodiment the first or the second separating element is provided on its edges at the side of the other separating element with a thickened portion which mutually separates the channels in a position of the catalytic converter housing relative to the exhaust section which varies from the normal position.

It will be apparent that this provides for situations in which rotation of the diverse components results and wherein the channels are nevertheless mutually separated.

The embodiment wherein the catalytic converter housing is seam-folded at its ends around the spacer element also results in an attractive, robust construction.

5           The present invention will be elucidated hereinbelow with reference to the annexed drawings, in which:

          figure 1 shows a cross-sectional view in lengthwise direction of a first embodiment of the  
10 invention;

          figure 2 shows a cross-sectional view along the line II-II of figure 1;

          figure 3 is a longitudinal section of a second embodiment of the invention;

15           figure 4 shows a detail view of the embodiment shown in figure 3 in a different position;

          figure 5 is a longitudinal section of a third embodiment of the present invention;

          figure 6 shows a view corresponding with figure  
20 5 of a fourth embodiment of the present invention;

          figure 7 shows a longitudinal section of a fifth embodiment of the present invention; and

          figure 8 is a longitudinal section of a sixth embodiment of the present invention.

25           Shown in figure 1 is a catalytic converter unit designated in its entirety with 1 and placed between a first exhaust section 2 and a second exhaust section 3. The catalytic converter unit is formed by a substrate 4, manufactured from for instance a ceramic material, in  
30 which are formed channels extending in longitudinal direction which are not shown in the drawing.

          The substrate is divided into a first section 5 and a second section 6 which are separated by a separating element in the form of a plate 7. A catalytic  
35 converter housing 8 in the form of a sleeve is arranged around catalytic converter substrate 4.

          Because catalytic converter housing 8 has a larger diameter than exhaust sections 2,3, a first, in

this case conical, connecting piece 9 is arranged between first exhaust section 2 and catalytic converter housing 8 and a second conical connecting piece 10 is arranged between second exhaust section 3 and catalytic converter housing 8. In the present case the conical connecting pieces are formed by conically deformed parts of the exhaust sections; it is possible to use other constructions for this purpose. Connection between catalytic converter housing 8 and both conical connecting pieces 9,10 takes place by means of a weld connection, as shown in the present figure, but it is also possible to make use of other types of connection, for instance a folded seam connection.

Arranged in first exhaust section 2 is a partition 11 whereby first exhaust section 2 is divided into two channels 12, 13. Supplied to these channels are flows originating from the cylinders, the ignition times of which are far removed from each other so as to prevent feedback of the gas flows. Separating plate 7 is arranged in the catalytic converter in order to also maintain this separation of the gas flows in the catalytic converter. It is of course quite possible to have partition 11 continue as far as the actual catalytic converter substrate 4, although this has the drawback that the ceramic catalytic converter substrate could quickly be destroyed in the case of possible mutual movement.

In some cases it is also important to maintain such a separation of gas flows after they have passed through the catalytic converter. For this purpose the separating plate 7 is extended on the side of the second exhaust section, to which it connects in a partition 14 arranged therein. This is however not important in all cases.

Figure 3 shows an embodiment wherein a mutual movement of the catalytic converter housing relative to both exhaust sections 2,3 is possible. For this purpose a shoulder 15 is formed on both sides of housing 8 in the form of a folded seam, wherein a sealing ring 16 is

arranged on the outer side of each of the shoulders. At the location of this shoulder 15 and this sealing ring 16 the first conical connecting piece 9 has a convex shape so that a good seal is obtained in diverse angular positions of first connecting piece 2 relative to catalytic converter unit 1. It is pointed out here that it is not necessary for the housing to extend as far as the convex conical part of first connecting piece 9; a gap 17 is left here. A similar construction is arranged on the other side of the catalytic converter unit.

In order to also ensure the separation between the gas flows as the angular position changes, the end of partition 11 is in this case provided with a thickened portion 18. As shown in figure 4, this thickened portion results in a good separation of the gas flows. This thickened portion can be formed by for instance a folded seam or an element fixed thereto in a different manner.

Figure 5 shows a third embodiment wherein, in order to compensate longitudinal expansion problems of the substrate of the catalytic converter, the substrate is divided in transverse direction into two sections so that, together with the other division, the catalytic converter is divided into four sections. Both sections are separated in longitudinal direction by an interspace 19. This space is available for absorbing expansion in longitudinal direction.

The substrate is further divided into two short sections by the division in transverse direction. This facilitates application by means of vapour deposition of the materials performing the catalytic function.

The embodiment of figure 6 also provides a somewhat resilient suspension of the sections of the catalytic converter substrate, in that the latter is received integrally in a spacer 20 taking for instance the form of a mat which is wrapped round the components of the catalytic converter. This mat is placed first in housing 8, whereafter the ends of the housing are seam-folded around spacer 20. This construction otherwise

corresponds with the third embodiment. It is possible and attractive to manufacture the mat from a ceramic web; it is however also possible to apply other materials such as glass fibre.

5           A spacer 20 can also be applied in an embodiment wherein a mutual rotation is not taken into account. This is shown in figure 7.

          In this embodiment the catalytic converter substrate is divided into only two sections which as in  
10 the first and second embodiment are separated by a separating plate 7 around which is wrapped a spacer 20. The thus created unit is placed in housing 8.

          Finally, figure 8 shows an embodiment which corresponds with the third embodiment shown in figure 5,  
15 but wherein use is made of exhaust pipes with a double C-configuration, such as can for instance be applied in engines with five cylinders or a multiple thereof. Use is made herein of an internal channel and two C-shaped external channels. The separation between the external  
20 channels mutually and between the external channels and the internal channel is formed by a separating element 21. A corresponding separating element 22 is arranged in the catalytic converter substrate. Here also a thickened portion 23 is arranged, the function of which corresponds  
25 with that of thickened portion 18 in figure 5. In respect of the different shape of the separating element, the thickened portion is herein embodied in the form of a ring.

          It will be apparent that, subject to the number  
30 of cylinders, any geometry can be applied.

          It will be apparent that the diverse embodiments can be mutually combined.

          In the embodiments according to figures 3, 4, 5, 6 and 8 the end surfaces of the catalytic converter  
35 elements have in each case a convex shape. This convex shape has the result that the channels in the middle of the catalytic converter - as seen in cross-section - are longer than at the periphery. The channels hereby have a

greater gas flow resistance in the middle than along the edge.

This effect forms at least a partial compensation for the fact that the density of the gas flow in the middle of the pipes is greater than at the edges. There thus results a more uniform distribution of the gas flow over the cross-section of the catalytic converter element.

It is otherwise possible to give the end surfaces a concave form. A reverse effect is then obtained. This can also be used to adapt the distribution of the gas flow.

With a combination of a concave and convex end wall the path length is balanced out again, so that the influence is neutral. The effects of the end surfaces can thus be used to influence the density of the gas flow.

G PEM/MvZ/G5

PCT/NL99/00368

(41)

## NEW CLAIMS

- 5           1. Catalytic converter unit (1) received  
between a first (2) and a second (3) exhaust section of  
an exhaust of an internal combustion engine, wherein the  
first exhaust section (2) is fit for connection to said  
internal combustion engine, comprising:
- 10           - a catalytic converter housing (8);  
            - a catalytic converter element (5,6) arranged  
in the catalytic converter housing;  
            - a first connecting piece arranged between the  
first exhaust section (2) and the catalytic converter  
15 housing (8); and  
            - a second connecting piece (10) arranged  
between the second exhaust section (3) and the catalytic  
converter housing (8),  
            wherein the first exhaust section (2) comprises  
20 at least two channels which are separated by a first  
separating element (11),  
            the catalytic converter element is divided in  
longitudinal direction into a number of parts (5,6)  
corresponding with the number of channels, which parts  
25 (5,6) are separated by at least a second separating  
element (7) aligned relative to the first separating  
element (11),  
            **characterized in that** the second separating  
element (7) extends from the catalytic converter element  
30 (5,6) at the side of the first exhaust section (2) into  
the first connecting piece (9).
2. Catalytic converter unit (1) as claimed in  
claim 1, **characterized in that** the first exhaust section  
(2) comprises two channels of substantially equal cross-  
35 section, that the first separating element (11) comprises  
a partition and that the second separating element (7)  
comprises a plate (10) separating two substantially  
identical parts (5,6) of the catalytic converter element.

3. Catalytic converter unit (1) as claimed in claim 1, **characterized in that** the first exhaust section (2) comprises an internal channel and two external channels of substantially C-shaped cross-section, wherein the cross-section of the C-shaped channels substantially equals double the cross-section of the internal channel, that the second separating element has a corresponding cross-section and that the catalytic converter element (5) is divided into corresponding parts.

4. Catalytic converter unit as claimed in claim 1, 2 or 3, **characterized in that** a narrow gap is situated between the first separating element (11) and the second separating element (7).

5. Catalytic converter unit as claimed in claim 1, 2 or 3, **characterized in that** the catalytic converter element is divided in transverse direction into at least two sections (5A,6A;5B,6B) separated by an interspace (19) and that the first separating element (11) connects onto the second separating element (7).

6. Catalytic converter unit as claimed in any of the foregoing claims, **characterized in that** the catalytic converter element (5,6) and the catalytic converter housing (8) are separated by a spacer element (20) extending around the catalytic converter element (5,6).

7. Catalytic converter unit as claimed in claim 6, **characterized in that** the spacer element (20) comprises a mat.

8. Catalytic converter unit as claimed in any of the foregoing claims, **characterized in that** rotation between the axis of the catalytic converter housing (8) and the axis of at least the first exhaust section (2) is possible on an axis extending transversely of one of these axes due to the connection (16) between the first conical connecting piece (9) and the catalytic converter housing (8), wherein the conical connecting piece (9) on the outside of the catalytic converter housing is connected sealingly to the outside of the catalytic



converter housing (8) and wherein a gap is formed between the edge of the catalytic converter housing (8) and the conical connecting piece (9).

9. Catalytic converter unit as claimed in claim 5 8, **characterized in that** a shoulder (15) is formed on the outside of the catalytic converter housing (8), a sealing ring (16) is arranged against the outside of the shoulder (15), wherein the first conical connecting piece (9) rests against the sealing ring.

10 10. Catalytic converter unit as claimed in claim 8 or 9, **characterized in that** the first (11) or the second (7) separating element is provided on its edges at the side of the other separating element (7,11) with a thickened portion (18) which mutually separates the 15 channels in a position of the catalytic converter housing (8) relative to the exhaust section (2) which varies from the normal position.

11. Catalytic converter unit as claimed in claim 10, **characterized in that** the catalytic converter 20 housing (8) is seam-folded at its ends around the spacer element (20).

## ABSTRACT OF THE DISCLOSURE

The invention relates to a catalytic converter unit received between a first and a second exhaust section of an exhaust of an internal combustion engine, comprising: a catalytic converter housing; a catalytic converter element arranged in the catalytic converter housing; a first connecting piece arranged between the first exhaust section and the catalytic converter housing; and a second connecting piece arranged between the second exhaust section and the catalytic converter housing, wherein at least the first exhaust section comprises at least two channels which are separated by a first separating element, and wherein the catalytic converter element is divided in longitudinal direction into a number of parts corresponding with the number of channels, which parts are separated by at least a second separating element aligned relative to the first separating element. These measures enable separated supply to the catalytic converter, also in the case of exhaust systems with separate channels for the supply of exhaust gases from different cylinders or different groups of cylinders. The use of such a separating element prevents destruction of the catalytic converter element in the case of possible temperature stresses. The partitions used with such separated channels could after all crush such a ceramic catalytic converter element.

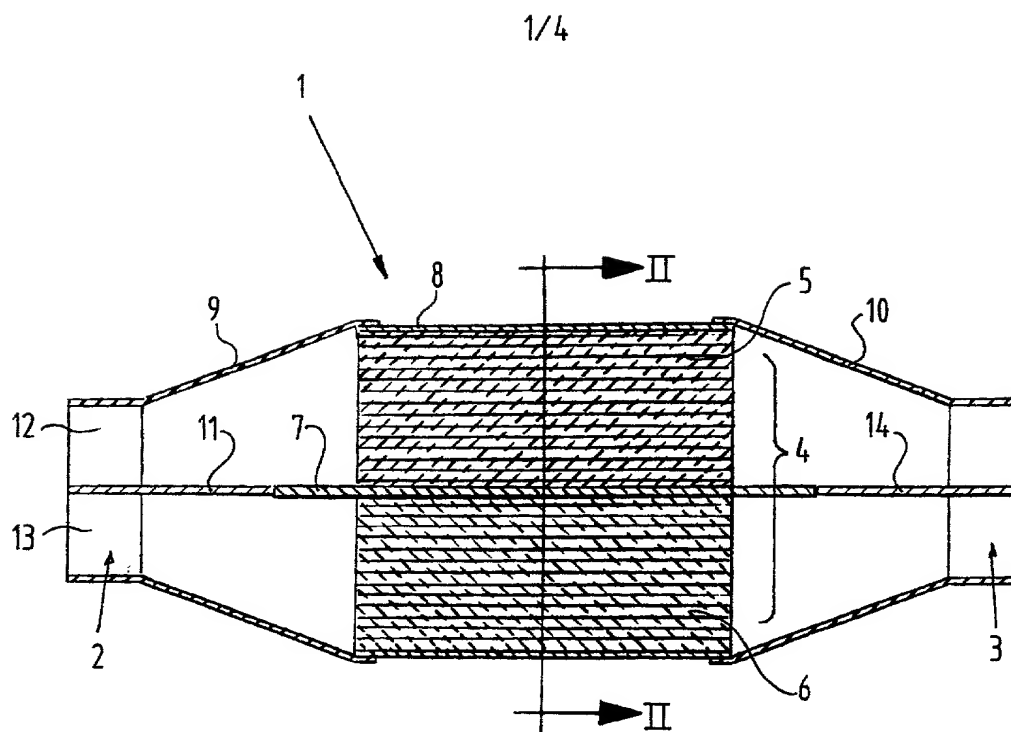


FIG. 1

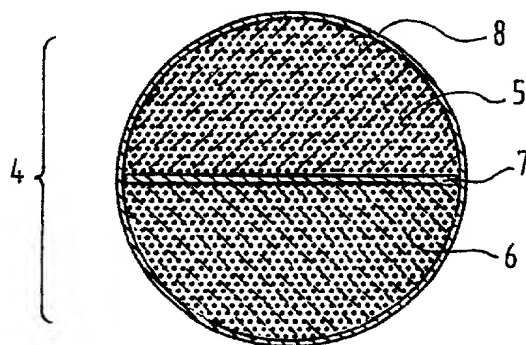


FIG. 2

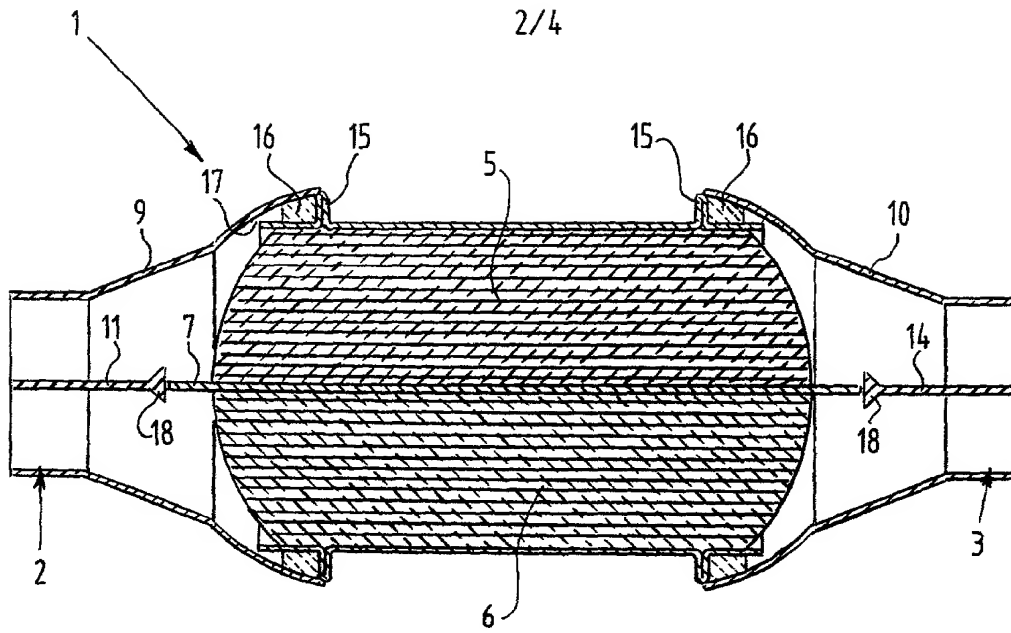


FIG. 3

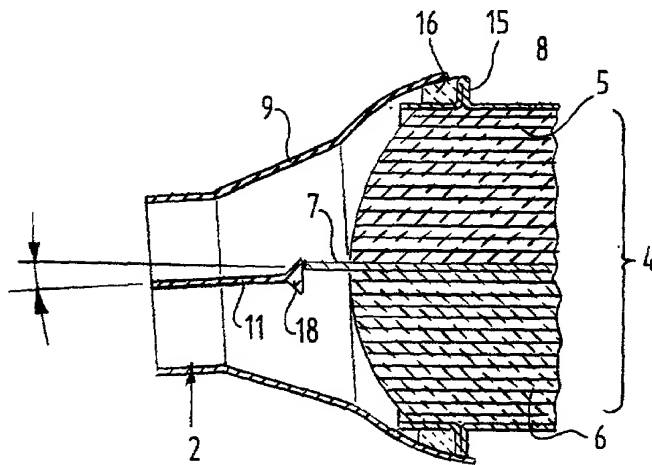
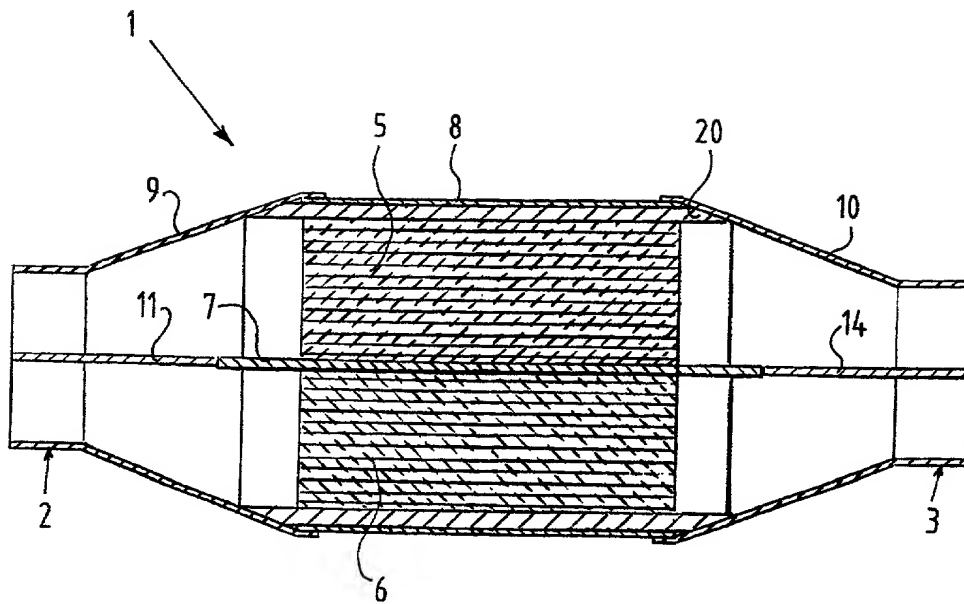
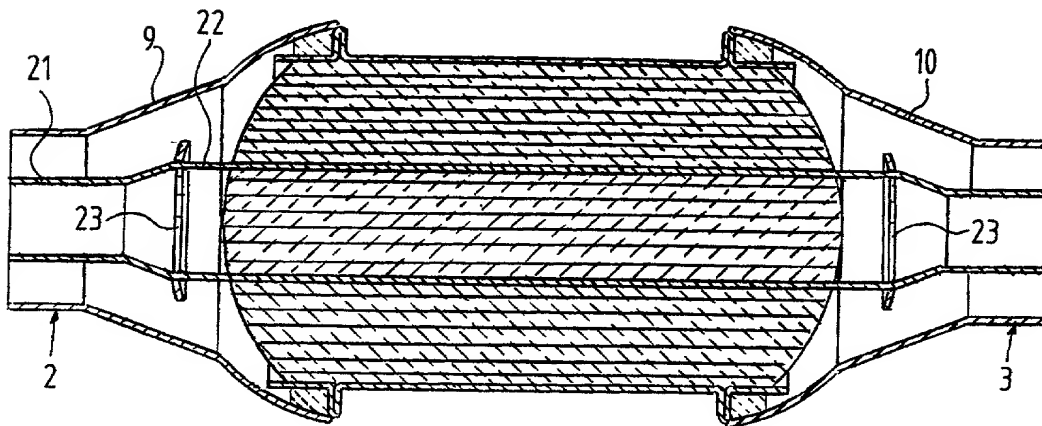


FIG. 4

3/4

FIG. 7FIG. 8

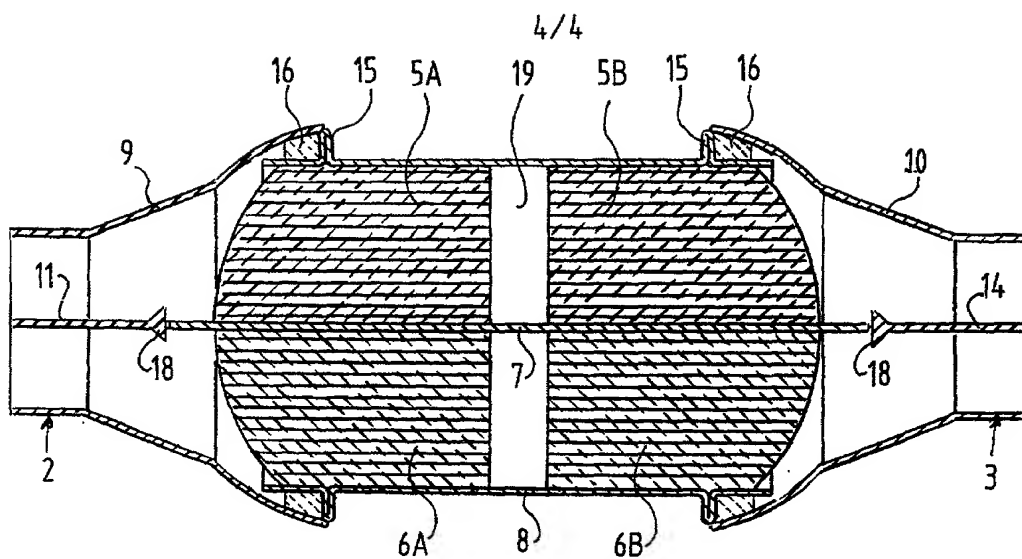


FIG. 5

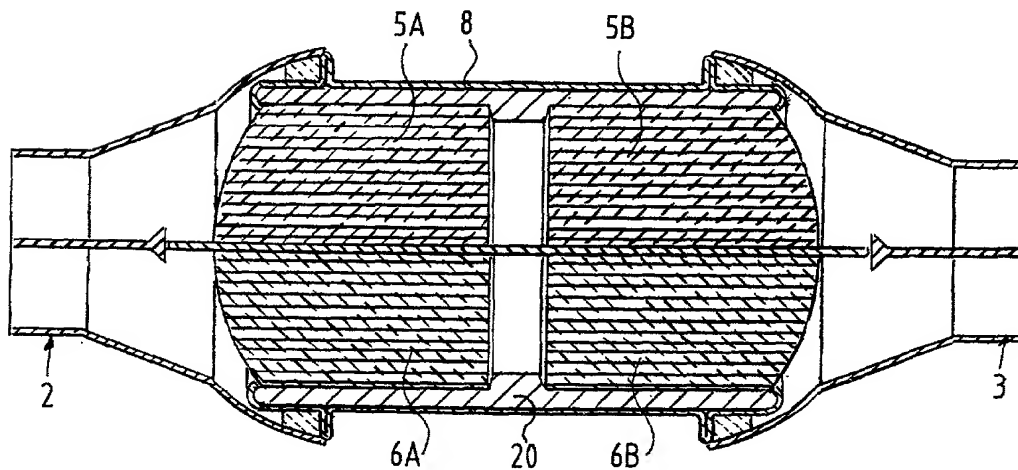


FIG. 6

Banner & Witcoff Ref. No.  
Client Ref. No.

00771.00016  
GPEM/NJ/Grand5

### SOLE DECLARATION FOR PATENT APPLICATION

As the below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my names;

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled IMPROVED CATALYSER HOUSING, the specification of which

- ☐ is attached hereto.
- ☒ was filed on December 22, 2000 as Application Serial Number 09/720,431 and was amended on December 22, 2000 (if applicable).
- ☒ was filed under the Patent Cooperation Treaty (PCT) and accorded International Application No. PCT/NL99/00368, filed June 14, 1999, and amended on June 26, 2000 (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I hereby acknowledge the duty to disclose information which is material to patentability in accordance with Title 37, Code of Federal Regulations, §1.56(a).

#### Prior Foreign Application(s)

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Country	Application No.	Date of Filing (day month year)	Date of Issue (day month year)	Priority Claimed Under 35 U.S.C. §119
The Netherlands	1009468	23 June 1998		yes

#### Prior United States Provisional Application(s)

I hereby claim priority benefits under Title 35, United States Code, §119(e)(1) of any U.S. provisional application listed below:

U.S. Provisional Application No.	Date of Filing (day month year)	Priority Claimed Under 35 U.S.C. §119(e)(1)

#### Prior United States Application(s)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Serial No.	Date of Filing (Day, Month, Year)	Status — Patented, Pending, Abandoned

Banner & Witcoff Ref. No.  
Client Ref. No.

00771.00016  
GPEN/NJ/Grands

### Power of Attorney

And I hereby appoint, both jointly and severally, as my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith the following attorneys and agents, their registration numbers being listed after their names:

ALTHER, Robert F.	31,810	HEMMENDINGER, Lisa M.	42,653	NELSON, Jon O.	24,566
BANNER, Donald W.	17,037	HONG, Patricia E.	34,373	NIEGOWSKI, James A.	28,331
BANNER, Mark T.	29,888	HOSCHETT, Dale H.	19,090	PATEL, Bimal J.	42,065
BANNER, Pamela I.	33,644	HYMEL, Lin J.	45,414	PATHAK, Ajay S.	38,266
BECKER, Matthew P.	45,824	IWANICKI, John P.	34,628	PETERSON, Thomas L.	30,969
BECKETT, William W.	18,262	JACKSON, Thomas H.	29,808	POTENZA, Joseph M.	28,175
BERGHAMMER, Joseph J.	46,057	KAGAN, Sarah A.	32,141	PRATT, Thomas K.	37,210
BODNER, Jordan	42,338	KATZ, Robert S.	36,402	RENK, Christopher J.	33,761
BUROW, Scott A.	42,373	KLEIN, William J.	43,719	RESIS, Robert H.	32,168
CALLAHAN, James V.	20,095	KRAUSE, Joseph P.	32,578	RIVARD, Paul M.	43,446
CHANG, Steve S.	42,402	LINEK, Ernest V.	29,822	ROBINSON, Douglas W.	32,751
COHAN, Gregory J.	40,959	MALONE, Dale A.	32,155	SCHAD, Steven P.	32,550
COOPERMAN, Marc S.	34,143	MAPLE, Marie-Claire B.	37,588	SHIFLEY, Charles W.	28,042
CURTIN, Joseph P.	34,571	MAY, Steven A.	44,912	SHULL, Jason	47,085
DAVID, Michael	44,642	McDERMOTT, Peter D.	29,411	SKERPON, Joseph M.	29,864
DeMOOR, Laura J.	39,654	McKEE, Christopher L.	32,384	VAN ES, J. Pieter	37,746
EVANS, Thomas L.	35,805	McKIE, Edward F.	17,335	WITCOFF, Sheldon W.	17,399
FEDORCHKO, Gary D.	35,509	MEDLOCK, Nina L.	29,673	WOLFFE, Franklin D.	19,724
FERGUSON, Catherine A.	40,877	MEECE, Timothy C.	38,553	WOLFFE, Susan A.	33,568
FICKLER, Debra A.	46,699	MEEKER, Frederic M.	35,282	WRIGHT, Bradley C.	38,061
FISHER, William J.	32,133	MILLER, Charles L.	43,805		
GLEMBOCKI, Christopher R.	38,800	MITRIUS, Janice V.	43,808		
HANLON, Brian E.	40,449	MOTTLEY, Darrell G.	42,912		

All correspondence and telephone communications should be addressed to:

Banner & Witcoff, Ltd.

Customer Number: 22907 (WDC)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature X [Signature] Date 19-02-2007  
 Full Name of Inventor GROBBENHAAR Hermanus G.  
 Residence (city, state or country) Herkenbosch, The Netherlands NL Citizenship Dutch  
 Post Office Address Stationsweg 82-d, NL-6075 CD, Herkenbosch, The Netherlands